

Foreign Exploration - Determining Appropriate Places to Collect Agents

Juan Briano

USDA-ARS-South American Biological Control Laboratory (SABCL)

Hurlingham, Argentina

The USDA-ARS has four overseas laboratories that function as arms of the ARS to conduct foreign explorations for classical biological control agents of exotic and invasive pests occurring in the United States. One of those overseas locations is the ARS-SABCL, whose main mission is the search, study, evaluation, and exportation of natural enemies of pests originated in Argentina and neighboring countries. The other ARS laboratories with similar missions are located in France, Australia, and China.

At present, the receivers of the beneficial organisms developed at SABCL are located not only in the US (ARS and Universities), but also in Australia (CSIRO, Commonwealth Scientific and Industrial Research Organization), South Africa (PPRI, Plant Protection Research Institute) and Europe (CABI, Center for Agriculture and Biosciences International). They are responsible to conduct further studies in quarantine and to release the beneficial organisms in the field.

Field exploration in the native range of the target pests is a key aspect for the success of the program. Basic and primary tools to start the explorations are museum and herbarium records, complete bibliographic search, and personal communication with local experts. However, at present, more sophisticated tools are available to select the most appropriate places to collect agents. Important considerations are, among others: 1) exact taxonomic identity of the target pests both in the native and exotic distributions; 2) genetic matching between them; 3) biological and geographical variations; 4) climate matching; 5) identify the source populations of the invasive pests; and 6) detect host preferences.

Consequently, multidisciplinary studies are involved in the selection process and deeply associated to the practice of classical biological control in general and field exploration in particular. Some of the most important disciplines are classical and chemical taxonomy, molecular biology, genetics, cladistics, botany, and biogeography.

In this presentation, real life cases of selection of places by SABCL researchers in Argentina are discussed for three invasive weeds (water primrose, alligator weed, and Brazilian peppertree) and three invasive insects (imported fire ant, little fire ant, and cactus mealybug).

Where to collect? What to collect? On what to collect? These are fundamental questions to answer at the beginning or during the course of the investigations. A wise, appropriate, and conscientious field exploration in the native land of the targets is essential to make the practice of classical biological control less risky, more successful, and, consequently, with a better public perception.